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CERTAIN ASPECTS OF THE GERMAN FISHING INDUSTRY

REPORT I - FISH PROCESSING MACHINERY

(Interview with Herr Baader, Nordischer Maschinenbau., Wackenitzmauer 33, Lubeck)

One of a series of six fishery leaflets* abstracted from BIOS FINAL REPORT No. 493, Item No. 22 prepared by Mr. W. H. Myles, Ministry of Fisheries, Dr. G. A. Reay, Department of Scientific and Industrial Research, and Lt. H. W. M. Farrer, Herring Industry Board, for the British Intelligence Objectives Sub-Committee, 32 Bryanstone Square, London, W. 1.

Contents

	Page
Herring "Gibbing" Machine	1
White Fish Filleting Machine	2
White Fish Skinning Machine	5
Herring Boning Machine	6
Herring "Nobbing" Machine	6
The Factory of Nordischer Maschinenbau	6
Appendix	7

Herring "Gibbing" Machine

"Gibbing" is the process effected by hand by the Scots herring girls in which the gills and gut of the fish are removed by an incision at the throat leaving the milt or roe in situ. Herrings are normally salt-cured in the "gibbed" condition. Owing to the probable difficulty of obtaining hand labour for this job in the future, the Herring Industry Board are much concerned to promote mechanisation.

We were given to understand by the Ministry of Food that a machine existed for this purpose, but this is not the case.

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*F.L. 206 Fish Processing Machinery, F.L. 207 Quick Freezing and Cold Storage of Fish, F.L. 208 Smoke Curing of Fish, F.L. 209 The Preservation of Fish by Canning and Related Processes, F.L. 210 "WIKING EIWEISS" (A Protein Product Manufactured from Fish), and F.L. 211 Institute for the Utilization of Fish of the Federal Fisheries Agency (Artificial Ice, Spoilage in Fish, Anti-Oxidants, and Fish Meal & Oil Manufacture).

Herr Baader explained that the main difficulty of applying mechanisation to this process was that of ensuring that the machine could be fed at sufficient speed. If fed by hand, the process would not be much quicker than that of hand "gibbing". Herr Baader, however, plans to introduce mechanical high speed feeding by using the "magic eye" or photo-electric cell in some way or other - not explained.

The construction of such a machine would take one year before trials and possibly another year for necessary improvements. It is probable that the delay would arise through devising a rapid means of feeding rather than in overcoming the actual process of "gibbing".

The eleven grades of Scots "Crown Brand" cure, based upon size and maturity, were explained to Herr Baader and it was pointed out that the girls grade the fish by dropping them into the appropriate tubs after "gibbing". Grading thus occupies no extra time. Herr Baader thought it would be possible to devise high speed grading to deliver a few sizes of fish. Further grading by size and by maturity could then no doubt be accomplished at the repacking stage of the cure. It was suggested to Herr Baader that size groups might be mechanically graded further on a weight basis that would probably correspond roughly with maturity differences.

We are given to understand that the Herring Industry Board is much concerned in the production of a machine of this nature. If this is so, we suggest that the Herring Industry Board, with a view to encouraging the production of machines that may meet their requirements, should approach Nordischer Maschinenbau, either direct or through Fisadco Ltd., London and Hull, which has a working agreement with Nordischer Maschinenbau. If the matter is pursued, it will be necessary for the Board to recommend through the Control Commission for Germany that the necessary materials for the production of the machine are made available.

White Fish Filleting Machine

General--This machine has been in existence now for a considerable number of years. It was brought to England and tested out in Hull in 1937, but further improvements were still called for in that the machine failed to sever completely the fillet from the carcase.

There are now said to be in existence 13 machines which are distributed as follows:-

4 at Bodo 3 at Trondheim 1 at Wremen	-	rented to the Nordsee Combine.
2 at Svolvaer	-	rented to Lohmann & Co.
1 at Wesermunde	-	(previously installed on s.t. "Weser").
1 at Nordischer Maschinenbau, Lubeck.		(requiring extensive repairs).
1 in the Wesermunde area	-	(requiring extensive repairs).

It is claimed that the machine has since 1937 been remodelled to the extent of 70 per cent, largely as a result of experiments in Norway during the war. The machine is now provided with an automatic clutch which throws it out of gear in the event of jamming, thereby preventing injury to the machine and loss of fish. The machine has also been improved to overcome trouble in the method of hand feeding. There is now not so much tearing of the flesh with the result that a smoother cut is obtained. Only 1½ to 2 per cent of the fish now turns out broken as compared with 10 per cent previously. If feeding is carefully done, broken fish may be reduced to only ½ per cent.

The fillet, which includes the flap or lug, is now severed completely at the tail as compared with formerly. The machine fillets 22 fish per minute, producing 44 fillets, and successfully takes, without adjustment, cod of 30 to 80 c.m. long (11-3/4" to 31½"). Longer fish, if thin, can be taken. Anything from 7 to 15 tons of fillet, according to size, are produced in 7 hours. The machine will deal with cod, haddock, saithe, ling, tusk as well as catfish. It will not take berghylt.

It was admitted by Herr Baader that in the winter season in Norway there had sometimes been trouble with the machine through freezing up. When this occurred, heat had to be applied and also hot water and salt, to thaw out the ice and soften the lubricant. Apart from this the machine is stated to be quite reliable. It was used on 16 trips on s.t. "Weser" over a period of 22 months and according to Herr Baader caused little or no trouble on the vessel. It was, however, inspected regularly every 4 or 5 trips and was operated on the vessel by specially trained men.

The labour requirements were stated to be as follows, but too much reliance should not be placed on the figures:-

Heading, i.e. placing fish on the machine for heading - 1 woman.

Placing fish with tail towards feed - 1 woman (or man).

Removal of bones from machine and placing fillets on transport bands to skinning machine with * odd trimming of fish still sticking to skeleton - 1 woman.

(* The machine is not 100 per cent perfect, there being so many different sizes of fish of varying hardness).

One man is required to examine the performance of the machine and make slight adjustments - say, every 15 minutes. This man can look after 3 machines at the same time.

The usual hire of a machine with service is 15,000 R.M. per annum (£750). We were informed that this sum also included the use of a skinning machine or skinning machines (two being necessary for one filleting machine), though there was conflicting evidence to the effect that the skinning machine had to be purchased.

Yield of Fillet--Herr Baader claimed that the yield of fillet when the machine was used was greater than that by hand filleting by 3 to 8 per cent. On this point we met with the most conflicting evidence from those with experience of both machine and hand filleting and it is extremely doubtful if the claim of greater yield when the machine is used can be substantiated.

The following statement summarises information put before us on the subject of yield:-

Lohmann & Co. (Herr Logmann and Dr. Schmidt)--They had used the machine at Hammerfest and later at Svolvaer and their yield of skinned fillet from headless cod was stated to be 45 to 46 per cent and from headless saithe 54 to 55 per cent. They stated also that when working with Finmarken fish the yield was only 41 to 42 per cent. Their impression was that the yield by hand and machine filleting was more or less the same. They could not say what proportion of the flap was retained.

Andersen & Co. (Herr Barez)--This firm operated one of the processing and freezing establishments in Norway during the war - at Melbo - but all their filleting was done by hand, though they used the Baader skinning machine.

Herr Barez had his records before him at the time of our visit and gave the yield of skinned fillet from headless cod by hand filleting as 54.1 per cent and from saithe as 59.2 per cent. He gave it as his opinion that the yield obtained from cod by machine filleting at certain other establishments was no more than 41 to 42 per cent, and seemed to accept as fact that hand filleting gave a much higher return than the machine.

Herr Roloff - Nordsee A.G., Wesermunde--This firm had experience of machine filleting at Trondheim and Bodo. Herr Roloff accepted quite readily that the yield from the machine was in the neighbourhood of 45 per cent. When it was stated to him that the yield by hand filleting at Melbo was 54 per cent, he explained it by saying that at Melbo the firm had been successful in getting a number of "anatomical artists" as filleters and their figure did not represent the average for Norwegian hand filleting.

Herr Roloff stated that they had comparative figures showing their own yields by machine and hand filleting and these he was prepared to supply to us through the Central Fisheries Office in Hamburg.

Dr. Schlienz of Kuhlfisch A.G., Wesermunde--Dr. Schlienz had experience of machine filleting on the s.t. "Weser". He stated that their yield of fillet from gutted, but not headed, cod was 38 to 40 per cent, but they were removing a considerable part of the flap.

Institut fur Fisch Verwertung der Reichsanstalt fur Fischerei (Dr. Lucke and Dr. Luneburg)--Dr. Lucke had no first hand evidence, but gave it as his opinion that there was greater waste when the machine was used than with hand filleting. He was quite prepared to accept 45 per cent from the machine as compared with 54 per cent from hand filleting. He stated that the reason for the use of the machine was the economy of manpower and not the greater return of fillet. He actually stated that one of the reasons for the spread of the machine in Germany was the lack of workmen "when Germany was preparing...."

There is thus unexplained conflict in the evidence with regard to the relative yield of fillet by machine and hand filleting.

Recommendation--In view of the importance of this machine to the white fish industry in Britain and in view of the conflicting evidence as to its performance, it seems desirable that a machine should be operated experimentally in a British port to find out its merits and demerits as compared with hand filleting.

The machine most suitable and likely to be ready most quickly is the one now removed from s.t. "Weser" and lying at Wesermunde. This machine is to be returned to Lubeck for reconditioning, which will take anything from three weeks to a month.

We have arranged through Mr. Johnston of the Central Fisheries Office in Hamburg for this machine to be transported to Lubeck for reconditioning, and as soon as the reconditioning is complete, for Mr. Johnston to communicate with 'T' Force in Hamburg with a view to having the machine requisitioned for shipment to England.

It has been suggested to Mr. Johnston that the machine should be shipped to the Port Fish Distribution Officer, Ministry of Food, Hull, and it will be for the Ministry of Food to make the necessary arrangements to have the experimental work conducted.

It is further recommended that -

i. The blue print and specification of the machine be obtained by Mr. Johnston from Nordischer Maschinenbau;

ii. When the machine is being tested in England, a German mechanic from Norway, who has had full experience of the machine in commercial operation, should be brought here to service the machine.

White Fish Skinning Machine

General--As far as is known this machine is entirely new to England - it has not been tested out here. There are in existence at present 20 machines distributed as follows:-

16 in Norway

4 in or around Wesermunde, one of which is a new unused model.

A transport band brings the fillets lying skin down to the machine which is operated by a 2 H.P. motor. The fillets are fed tail first between two rollers and, immediately on pressure being created between the rollers by the fish, a knife goes into action that completely and evenly removes the skin. This is seized below between brush rollers and delivered separately from the fillet, which travels on in the original direction to be received, if desired, on a transport band.

If the skins are to be used for leather manufacture, the fish has to be scaled before skinning, otherwise the roller pressure forces the scales into the skin thus creating small holes which render the skin unfit for leather manufacture.

The machine deals with 20 to 25 fillets per minute. Two skinning machines are thus required for each filleting machine. Usually one man is required to feed each skinning machine. Six to nine persons are required on each filleting/skinning unit to wrap and pack the fillets. These machines are stated to have performed satisfactorily throughout the war in Norway.

Recommendation--As this machine, like the filleting machine, is likely to be of interest to the British white fish industry, we have arranged with Mr. Johnston that when transport is provided to bring the white fish filleting machine from Wesermunde to Lubeck, the new model skinning machine should also be brought. This machine will be requisitioned by 'T' Force in Hamburg at the same time as the filleting machine is requisitioned and will be shipped to the Port Fish Distribution Officer, Ministry of Food, Hull. The Ministry of Food will no doubt make arrangements to have this machine tried out at the same time as the filleting machine is being carried through its trials.

Herring Boning Machine

This machine is well known and in considerable use in the United Kingdom. Very great numbers were seen in various states of repair at the production factory in Lubeck and in various processing factories visited. The Central Fisheries Office in Hamburg has a list of 190 machines and their dispositions in Germany. The machines are hired weekly for a payment of 85 R.M. or an annual payment of 1,800 R.M. to 2,000 R.M., including servicing.

No recommendation is necessary as the machine is well known in the United Kingdom.

Herring "Nobbing" Machine

"Nobbing" is the process of removing the head of the herring along with the gut leaving the milt or roe *in situ*. In this form herrings are mostly canned in the United Kingdom. Although Herr Baader had made a "nobbing" machine, it did not prove satisfactory in practice. He has full plans, however, for the construction of a new machine that he considers will be highly efficient, and he stated that if material were available, construction would take up to six months.

The present position should be put before the Herring Industry Board.

The Factory of Nordischer Maschinenbau

The factory of the Nordischer Maschinenbau is undamaged by war and is now in operation under Military Government. Throughout the war the factory was employed in the production of Dornier parts, but is now turned over again to peacetime operations on fish processing machinery of which the bulk at the moment seems to be reconditioning.

In view of the special equipment of this establishment, the number of trained personnel employed and the ease with which the factory can be turned over to war production, it is suggested that in the future this concern should be closely supervised by the Military Government to ensure that its activities are confined to the important purpose for which it exists.

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Appendix

A comparison of the performance of hand and machine work in filleting is not possible without further experience. Whilst by hand each fish can be filleted without much ado, a good performance of the machine is only to be obtained, if fish of uniform size are used. In all the cases where the fish before working up could be sorted, i.e., therefore, when greater quantities of fish of equal size were landed, the machine is superior to hand work. Quite otherwise is the position, if fish, as is customary on the German market, is landed in absolutely unequal sizes and of completely different sorts. In this case, in order to obtain a significantly good performance of the machine, the fish must be sorted and the sizes, unsuitable for the machine, worked by hand. The sizes of fish most favourable for the machine are those that are most quickly handled by hand. In machine and hand operation, the machine will therefore always work up the handiest sizes, whilst for hand filleting will remain the surplus "unkuranten" sizes. In operations on a large scale it will always pay to install one or two machines. In the German fish business hand labour cannot be completely excluded, so long as a machine has not been successfully devised that will handle without hesitation every size and kind of fish. The performance of the machine in filleting is for the suitable sorts of fish naturally really greater.

The yield of fish in filleting is according to experience up to date entirely equal; the greatest possible quantity of flesh being obtained as well by machine as by hand. The yield lies between 40 and 54 per cent. With cod are 42 - 45 per cent, with haddock some 40 per cent, and with Saithe ca 50 - 54 per cent net yields of fish flesh obtained. The losses of fish due to crushing by the machine as at first designed have largely been avoided by later improvement.

Fundamentally one can say on the basis of experience up till now, that the introduction of filleting machines only is profitable, when over a longer time round fish of regular size can be disposed of. Fish of a size up to 30 cm. are so far not suitable for the machine and are on this account more satisfactorily worked by hand.